CHARGE NO.: 1804

PROGRAM TITLE: Expanded Tobacco - Process Improvement

PERIOD COVERED: July 1-31, 1980

PROJECT LEADER: R. G. Uhl

I. Breakage

Pilot plant trials evaluated the MC clumpbreaker rotational speed (60 rpm) against normal pilot conditions (17 rpm) and showed a small advantage {Δ% (longs + mediums) = + 1 1/2} at the lower speed. Plans are being formulated to evaluate reduced rpm at the MC. A new gearbox is being installed on the pilot clumpbreaker to investigate even lower speeds. Removal of static breaker bars at the MC does not appear feasible because of a potential problem which could result from still-frozen clumps exiting the expansion tower. (cigarette wet spots in make/pack). Some means for removing these clumps would be required before trials could be conducted in this area.

The testing of modified impregnation cylces continued in an attempt to reduce hardness and prevalence of clumps exiting the impregnator. Reducing the pilot batch size by 30-50% has shown a marked improvement. A test grid has been initiated varying feed OV, impregnation pressure and batch size (each at several tower exit OV's) to determine the overall effect on batch compression, clumping, breakage and CV. Initial results indicate that intermediate moistures and pressures (16% OV, 550 psi) minimize the occurence of a clump at one particular spot in the batch and give a more uniform impregnation.

The existing MC impregnators are rated for 480 psi which would essentially limit us to present process conditions with this equipment. The best results in this case have been obtained with a three minute gas purge following the drain cycle. However, results have been enatic with a considerable variation in the amount of improvement achieved. The best apparent process conditions resulting from this study will be used to impregnate batches which we will attempt to process with the clumbreaker removed.

Examination of the hardest clumps has shown a definite orientation of tobacco shreds, apparently in what would be the horizontal plane in the impregnator. The clumps are impervious to a compressive force applied perpendicular to this plane. However, they break up easily when a compressive force is applied parallel to this plane, indicating that some sort of "side squeezing" mechanism might be employed. This shred orientation was not apparent in reduced-size batches processed at intermediate moisture and pressure. These were randomly oriented, less compressed during impregnation and loosely agglomerated. Tests are planned to evaluate extended liquid fill/drain times to determine whether rapid fill could be fluidizing the tobacco batch and allowing it to settle in horizontal layers.

Orientation of tobacco shreds and compression of the batch during impregnation appear to correlate directly with the presence and hardness of clumps.

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II. CO_2 Expanded ES

Rolled/cut bright stem and a 50/50 bright stem/bright strip blend were CO_2 expanded in the Phase III system at two feedstock moistures (12% and 20% OV). The reordered equilibrium CV/OV values for the expanded pure stem material were 35.9/13.9 and 42.8/13.9 for the 12% and 20% OV feed, respectively. Results for the 50/50 blends were about what would be predicted by blending the individual materials.

III. Alkaloid Recovery

Results of the initial scrubber efficiency test (fresh water in the system) showed a 100% efficiency in removing nicotine from the tower tail gas. Subsequent closed loop operation again showed the alkaloid content in the liquor levelling off at 0.5%. This has been traced to tower warmup with the normal steam atmosphere process gas. This caused recovery of tower steam, but no alkaloids since tobacco was not being processed. Steam condensate lines are being bled to also prevent dumping of condensate into the tower system during steam startup.

Cation exchange resins (hydrogen exchange type) have been ordered to allow evaluation of this technique for recovering nicotine from the scrubber water. It is planned to utilize scrubber water directly as makeup to the burley strip washer when this unit becomes operational. (In a production situation, washing ≈ 30% of the burley strip would allow direct utilization of the scrubber overflow from the manufacturing expansion facilities).

IV. Miscellaneous

Airco samples 77-80 were processed and shipped. Tests were conducted to evaluate expansion tower equipment as a means for removing alcohol from WS cut filler.

Personnel from this project and Project 1801 assisted in the production test evaluating Westab impregnated filler in the MC/DET tangential tower. A trial summary will be issued by Westab QA. Equilibrated CV's appeared to be reasonable, especially in light of the high tower exit OV's (≈ 5%) which were experienced. Tower exit OV's were higher than the values obtained in the pilot plant (≈ 3 1/2% OV) at the same temperature, which is attributable to the higher tobacco loading (4,000 lbs/hr versus an equivalent pilot rate of 1,700 lbs/hr).

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